REMARKS

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Claims 24, 36, 41, and 42 are currently being amended. Support for the amendments may be found throughout Applicant's specification, e.g. at Fig. 1. No new matter was added.

After amending the claims as set forth above, claims 24-26, 36, 41 and 42 are now pending in this application.

Applicant's amendment is made solely to advance prosecution. Applicant reserves the right to pursue claims directed to the subject matter of the amended claims as previously presented at a later date, e.g. in a continuing Application.

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Rejection under U.S.C. 103(a)

Claims 24-26, 36 and 41, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kendig et al. US Patent No. 4,955,269 (henceforth "Kendig") in view of applicant's admitted prior art page 12, line 9-17, and in possible further view of Kotoulas US Patent No. 6,751,602 (henceforth "Kotoulas"). Applicants respectfully traverse.

Initially, Applicant does not concede that the proposed combinations of the references and/or the admitted prior art would have been obvious to one skilled in the art at the time of the invention. However, even assuming, *arguendo*, that the proposed combinations are proper, they still fail to teach or suggest each and every element of Applicant's claims. (See MPEP § 2141).

As amended, Applicant's independent apparatus claims 24 and 41 recite:

> an amplitude computation device which receives said in-phase (I) and quadrature (Q) components [of a signal from a vibratory sensor] and computes the instantaneous amplitude (a) of said digital sinusoidal signal by processing said in-phase (I) and quadrature (Q) components according to the equation $a = \sqrt{(Q^2 + I^2)}$;
>
> a phase computation device which receives said in-phase (I) and quadrature (Q) components and computes the...**phase** (ϕ) of said digital sinusoidal signal by processing said in-phase (I) and quadrature (Q) components according to the equation $\phi = \tan^{-1}(Q/I)$; and
>
> an **output** which provides the computed instantaneous amplitude (a) and...**phase** (ϕ). (emphasis added).

Similarly, Applicant's independent method claims 36 and 42 recite:

> processing...in-phase (I) and quadrature (Q) signals [from a vibratory sensor] to compute [the] amplitude (a) of said digital sinusoidal signal by applying the equation $a = \sqrt{(Q^2 + I^2)}$;
>
> processing said in-phase (I) and quadrature (Q) signals to compute [the]... **phase** (ϕ) of said digital sinusoidal signal by applying the equation $\phi = \tan^{-1}(Q/I)$; and outputting the computed instantaneous amplitude (a) and
>
> **outputting** the computed...amplitude (a) and ... **phase** (ϕ). (emphasis added).

Applicant can find no disclosure, teaching, or suggestion in the cited portions of the prior of a device or method for computing and outputting the phase of a signal as required by these claims.

The Office Action alleges that Kendig (at column 5, equation 6) teaches a device which calculates the instantaneous phase of a signal. Applicant respectfully disagrees. The Kendig device operates to monitor for vibratory fatigue of an object (e.g. a turbine blade). (Abstract). Signals from sensors are processed to "detect the amplitude envelope and **instantaneous frequency** of the displacement" of the object. (Abstract, emphasis added). These two pieces of information, along with a steady state stress measurement form a *complete set* of quantities

needed to determine the fatigue usage of the object, which is output from the Kendig device. (See col. 5, lines 6-30).

Figure 5 of Kendig, excerpted and annotated below, clearly shows that the output of signal processor 44 consists entirely of three quantities: and amplitude envelope, and instantaneous frequency, and a steady state stress. Accordingly, there is no teaching that the Kendig device calculates or outputs the phase of a signal, as required by Applicant's claims.

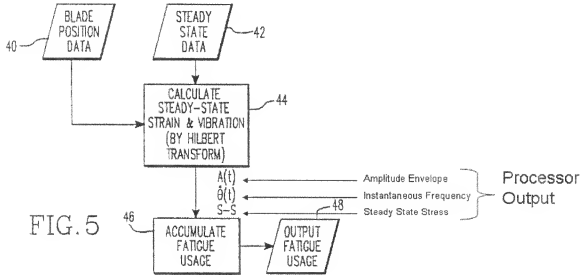

FIG. 5

The Office Action alleges that equation 5 of Kendig teaches computation of the instantaneous phase. However, the cited passage (column 5, lines 1-15) reads in full:

blades. The Hilbert transform of a vibration signal v(t) is defined in equation (3).

$$H(v(t)) = (1/\pi) \int_{-\infty}^{\infty} [v(u)/(t-u)]du \quad (3)$$

The magnitude or amplitude envelope of the signal v(t) is defined by equation (4).

$$A(t) = |v(t)| = \sqrt{v(t)^2 + H(v(t))^2} \quad (4)$$

This corresponds to the amplitude envelope A(t) indicated by dashed lines in FIG. 6. The instantaneous frequency $\dot{\theta}$ is defined by equation (5) where $\theta(t)$ is defined by equation (6).

$$\dot{\theta}(t) = (1/\pi)(d\theta(t)/dt) \quad (5)$$

$$\theta(t) = \arctan(H(v(t))/v(t)) \quad (6)$$

This passage merely describes the mathematical relationship between the instantaneous phase and the instantaneous frequency of a signal. There is no teaching or suggestion that the phase be actually computed or output. Instead, Kendig (Fig. 5 and col. 5, lines 6-30) teaches that the phase of the signal is not a necessary quantity for use in determining fatigue. Thus, adding additional processing for calculating and/or outputting the instantaneous phase could disadvantageously complicate the Kendig device, while serving no benefit towards its intended purpose of measuring fatigue of an object undergoing vibration.

Neither the admitted prior art nor Kotoulas, as applied by the Office Action, act to cure the above described deficiencies of Kendig. In particular, as argued in detail in Applicant's previous response filed November 26, 2008, Kotoulas does not teach or suggest computation of the phase of a vibratory signal.

In view of the above, Applicant respectfully submits that there is no proper basis for the rejection under 35 USC §103 of independent claims 24, 36, 41, and 42 because the cited portions of the prior art fail to teach or suggest each and every element of these claims. (See MPEP §2141). Each of the remaining claims depend, directly or indirectly, from one of independent claims 24, 36, 41, and 42 and therefore is patentable over the cited portions of the prior art for at

least the same reasons. According, Applicant respectfully requests reconsideration and withdrawal of all rejections under 35 USC §103.

Conclusion

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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By 

FOLEY & LARDNER LLP
Customer Number: 48329
Telephone: (617) 342-4093
Facsimile: (617) 342-4001

Ralph Trementozzi
Attorney for Applicant
Registration No. 55,686